AN ANALYSIS OF NATIONAL ADVANCED SYSTEMS

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NATIONAL ADVANCED SYSTEMS

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HITACHI AMERICA, LTD.

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NATIONAL ADVANCED SYSTEMS

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AN ANALYSIS OF

NATIONAL ADVANCED SYSTEMS

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EXHIBITS

I INTRODUCTION

I INTRODUCTION

- The objective of this study was to determine the long-range prospects for National Advanced Systems (NAS) as a valuable outlet for HITACHI mainframes. Emphasis in the study was placed on:

    - Updating user attitudes from the 1980 survey and adding 50% more users of HITACHI equipment to the sample size from 1980.

    - Updating evaluations of key management with special emphasis on new field engineering leadership.

    - Evaluating sales capability in large, complex systems proposals.

    - Examining the San Diego operations with regard to product developments.

    - Determining NAS business strategies and any National Semiconductor strategies affecting NAS.

    - Assessing capabilities of software support and software development activities.

    - Examining NAS financial strength.

- Chapter II, "Executive Summary," presents an overview of findings and summary of details to be discussed in later chapters.

    - Conclusions are drawn at the end of Chapter II, based on the detailed report in Chapters III and IV.

    - Recommendations for HITACHI's consideration are also presented in Chapter II.

- Chapter III presents the analysis and findings from field research and discusses the methodology used in that research.

- Chapter IV presents the findings and analysis of the user surveys.

- Throughout this study the reference to NAS systems means those manufactured by National Advanced Systems. HITACHI systems or users refers to systems users or systems manufactured by HITACHI.

II EXECUTIVE SUMMARY

II   EXECUTIVE SUMMARY

A.   SUMMARY OF FINDINGS

I.   USER INSTALLED BASE

● The installed base of systems has grown from 1980, and remains well established.

  - Users remain satisfied with both NAS and HITACHI systems, though more so with the HITACHI equipment.

  - Users have become more critical of NAS since 1980, due in part to the fact that NAS was accepted in 1980 as having saved them from a bankrupt Itel.

  - ISS disk drives continue to adversely affect the attitudes of users toward all the equipment installed by NAS.

  - HITACHI disk drives are well received by users.

● The greatest concern expressed by users of plug compatible mainframes (PCMs) is not with a particular manufacturer's hardware, but with the future ability of PCMs to remain compatible with IBM software and firmware changes.

- Overall user satisfaction is best exhibited by the fact that 85% of those surveyed said that they would upgrade with NAS mainframes and/or enhancements.

  - NAS improved its own product image with users, from 64% in 1980 to 80% in 1981, as shown in Exhibit II-1.

  - Of those HITACHI users who originally responded in 1980 and who responded again in 1981, 100% said they would look to NAS for new equipment.

  - Twenty of the total 23 HITACHI users who responded in 1981 (87%) said they were in favor of repeating business with HITACHI equipment.

  - Those concerned were primarily concerned about future compatibility, not current service or reliability.

- A slight trend toward leasing of equipment was detected by the survey.

  - The trend is more pronounced in NAS systems than in HITACHI systems, which were proportionately higher last year.

  - More systems on lease will give NAS greater control of the installed base through mandatory service contracts.

- Reliability remains the number one factor when users select a plug compatible mainframe vendor.

- Users would like to see more publicity efforts by NAS; they see NAS as a "footnote" to publicity about National Semiconductor.

2. NAS MANAGEMENT

- The "matrix" management effect of 1980 has been removed, and autonomy has been granted to NAS management.

EXHIBIT II-1

RESPONSES TO QUESTION:
"WILL YOU UPGRADE WITH NAS?"

RESPONSES	PERCENT OF RESPONDENTS				
	NAS		HITACHI		
	1980	1981	1980 USERS	1980 USERS IN 1981	ALL USERS 1981
Yes	64%	80%	91%	100%	87%
No	18	10	0	0	9
Don't Know	18	10	9	0	4
Total Respondents	11	10	11	8	23

- Middle management has been weakened by resignations, especially in the field engineering department and in software support.

- The organizational structure of NAS removes control of vital support functions from the line organization, especially in field engineering.

- Top management shows some improvement over 1980, but remains more oriented toward production of semiconductors than marketing of computers.

3. SAN DIEGO OPERATIONS

- Management remains optimistic that NAS can develop and manufacture competitive mainframes although the "Shark" (203 system) continues to have production and reliability problems.

- The fabrication of HITACHI memory chips is a welcomed activity by production personnel.

- There is concern among non-engineering, non-management personnel in San Diego that there will be nothing to manufacture after AS/5000.

- Software support functions located in San Diego serve field-reported problems for NAS and HITACHI users, with necessary follow-up at Mountain View for HITACHI resolutions.

4. FINANCIAL PERFORMANCE

- NAS continues to improve profitability.

- NAS's contribution to National Semiconductor's revenue for fiscal 1981 was $285 million of the total $1,154 million.

- National's first quarter (fiscal year, 1982) earnings would have been negative except for NAS's profits.

B.   CONCLUSIONS

I.   STRATEGIES

- National Semiconductor completed Phase One of the NAS strategy by cleaning up the AS/5000 inventories and creating an autonomous division easily marketable to other corporations.

- Failure to control the exclusive rights to sell HITACHI's plug compatible mainframes will frustrate National's attempts to keep NAS a highly attractive acquisition target. National's strategy is aimed at overcoming the problem by continuing to try for exclusivity and by controlling the installed base through other means.

- NAS will continue to remain visible in attempts to develop its own mainframes until control objectives are met, or NAS is sold for a sizable profit.

- National sees NAS as more of an asset currently because of the soft market in semiconductors; NAS profitability offsets financial problems at National for the immediate future.

- Strategic trends of National are usually detectable early by watching moves by Texas Instruments; Charles Sporck is said to have a burning desire to emulate and overtake TI.

- Product strategy appears to be limited to the "Shark"; however, one unfounded rumor is that the "400" will be revived. (INPUT places no credence in this rumor.)

2.   OTHER CONCLUSIONS

- NAS must depend on HITACHI for systems. San Diego is no threat to HITACHI.

- The field engineering department is weak and will lose more key personnel by the end of calendar 1981.

- The sales force is technically qualified to sell large systems, but should specialize or be enlarged if the quota is to be met.

- NAS is too conservative to develop applications software for the competitive marketplace.

- NAS remains financially sound.

- Software support is good at resolving operating systems compatibility problems, but inconsistent in other areas.

- The systems installed base remains a tremendously valuable asset.

- The organizational structure and individuals involved suggest that NAS is oriented much more toward product and engineering than toward the selling and support of the marketplace.

- There is a significant void developing in the NAS installed base relative to the 43XX. This size of user is key to growth in larger systems over the next five years.

C. RECOMMENDATIONS

- HITACHI should seriously consider alternatives to exclusive contracts with NAS; some of the possibilities are:

    - A subsidiary of HITACHI America, Ltd., run by American management for sales and service.

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- Multiple, specialized distributors of systems such as VION for the Federal Government, etc. Provide one source of service through an HITACHI-controlled field service company.

- A transition strategy in software, supporting compatibility while simultaneously supporting user transition to HITACHI software over the next five years.

● Impose conditions for NAS to continue the present relationship, such as:

- Insist on one-year firm orders for large systems; that is, have NAS agree to take delivery and pay for all systems delivered on one-year projections, whether they have buyers or not.

- Insist on stronger organization and experienced leadership in field engineering.

- Use the HITACHI 240H to fill the void in the 43XX installed base; do not depend on the "Shark" to establish a share of this vital base.

● Employ at least one native American who is knowledgeable in the large systems market to attend critical meetings with NAS.

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III FIELD RESEARCH

III   FIELD RESEARCH

A.   METHODOLOGY AND SCOPE

- Eleven interviews with key personnel, either currently or recently employed by NAS, were conducted between July 21, 1981, and September 28, 1981.

    - Included among the interviewees were:

        . A divisional president.

        . Five vice presidents.

        . One director level.

    - All interviews were conducted in person.

- Short, unstructured telephone conversations about NAS were conducted with another nine persons associated with NAS.

- Key interviews were with management representing:

    - Marketing and planning.

    - Software support and development.

- Field engineering.

- Training and hardware support.

- Personnel.

- Discussions during the interviews covered the following topics:

  - Planning and strategy.

  - Sales.

  - Organization.

  - Management.

  - Field engineering.

  - Financial performance.

  - Attitudes of users and NAS personnel.

  - Personnel turnover problems.

  - Rumors and publicity announcements.

- Other field research consisted of:

  - Reading of news articles published over the past 14 months.

  - Conversations with two executive search firms.

  - Discussions with industry executives not associated directly with NAS about issues which may affect the business interests of NAS.

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B. ORGANIZATION

● Significant organization changes have occurred since the 1980 report to HITACHI.

- Matrix management structures which overlapped National Semiconductor have been eliminated as of the middle of September, 1981.

  . Close supervision of NAS operations by trusted functional managers within National Semiconductor is no longer required.

  . The matrix arrangement was a major driving force behind the turnover of qualified ex-Itel personnel, especially middle managers.

- Heavy losses of the top level personnel in field support required a new organization which allows those remaining to function within their qualifications.

- The differences between the business environments of NAS and National Semiconductor make it imperative that NAS operate as an autonomous division or subsidiary.

● The operations of NAS are divided into four areas of concentration which are managed by the "Executive Office," as shown in Exhibit III-1.

- The Executive Office is headed by Floyd Kvamme, President, and three Executive Vice Presidents: D. Martin, R. Allen, and R. Heikes.

- All four members of the Executive Office function as General Managers of various operations, shown also in Exhibit III-1 in overview.

EXHIBIT III-1

NAS EXECUTIVE OFFICE RESPONSIBILITIES
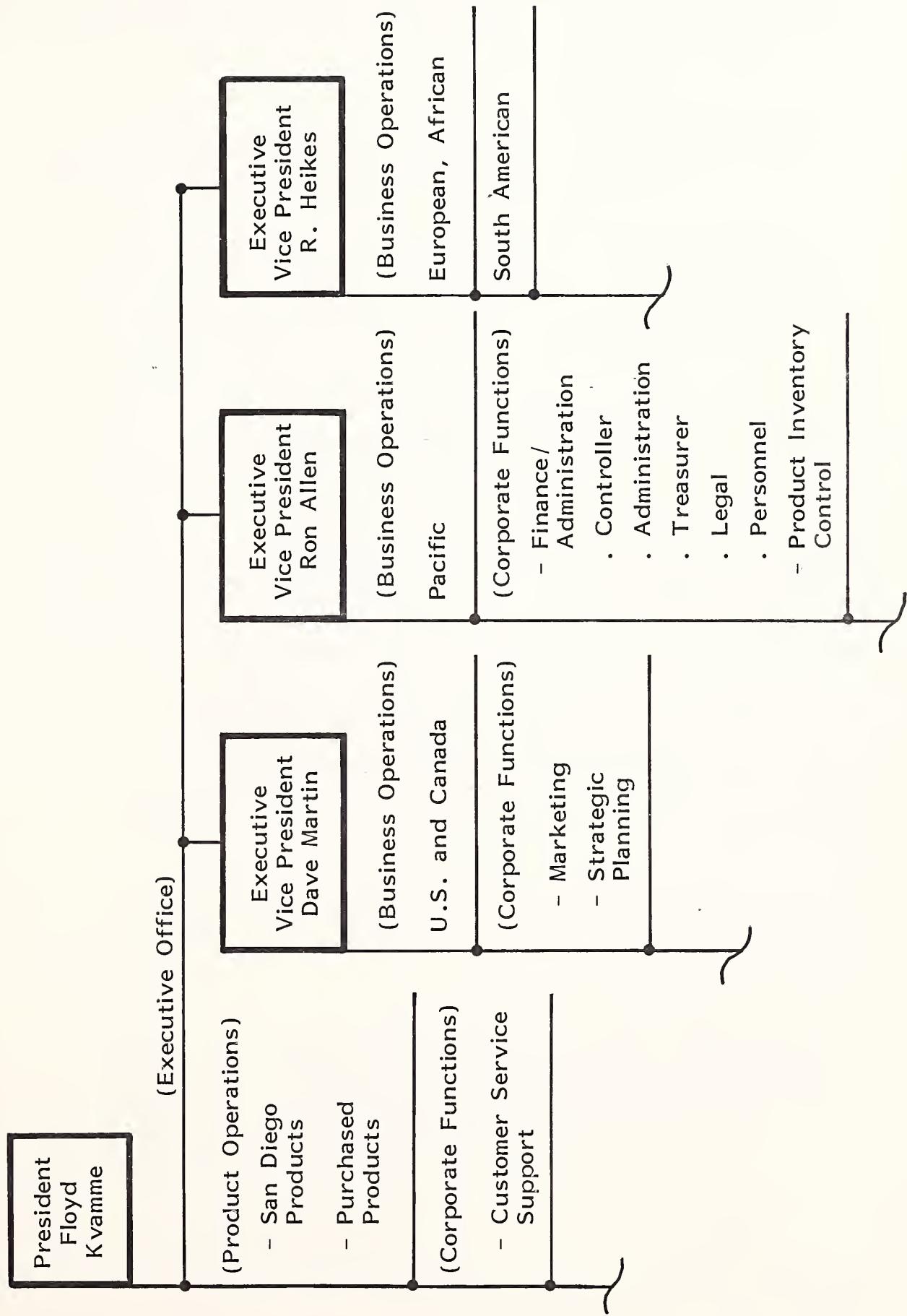
- The functional areas of greatest interest to HITACHI are U.S. Operations, shown in Exhibit III-2, and Purchased Products Operations, shown in Exhibit III-3.

  - The domestic line operations for both sales and field engineering now report directly to Dave Martin, as shown in Exhibit III-2.

    - The sales organization headed by Jerry Ungerman is organized as four regions consisting of approximately 50 sales persons and 80 software support representatives located within field offices.

    - The field engineering organization headed by C.B. Luce is also organized as four regions with approximately 475 field service engineers.

  - Headquarters support for both sales and field service report to Floyd Kvamme who is the General Manager for Product Operations as well as being President of NAS, as shown in Exhibit III-3.

    - This structure is unusual in that the support for field line operations reports to a higher NAS authority than does the line organization itself, the reverse of most support reporting structures.

    - Dave Turner manages all technical support for field operations including the purchased systems support, as shown in Exhibit III-3.

    - Logistics for field engineering support reports on a "Dotted line" to Turner, but the individual (L. Cole) actually reports to R. Allen with broader authority for product inventory control.

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EXHIBIT III-2

NAS U.S. BUSINESS OPERATIONS

```
                    ┌─────────────────────┐
                    │  General Manager    │
                    │   (Executive        │
                    │  Vice President)    │
                    │   Dave Martin       │
                    └─────────────────────┘
```

Sales Vice President Jerry Ungerman		**Field** Engineering Vice President C.B. Luce
Regions (4)		Regions (4)
Branches (25)		Branches (25)
Salespersons (50)		FE Personnel ($\simeq 475$)
Software Support Representatives ($\simeq 80$)		

```
                    ┌─────────────────────┐
                    │    Strategic        │
                    │    Planning         │
                    │   P. Stapleton      │
                    └─────────────────────┘
```

(Corporate Planning)
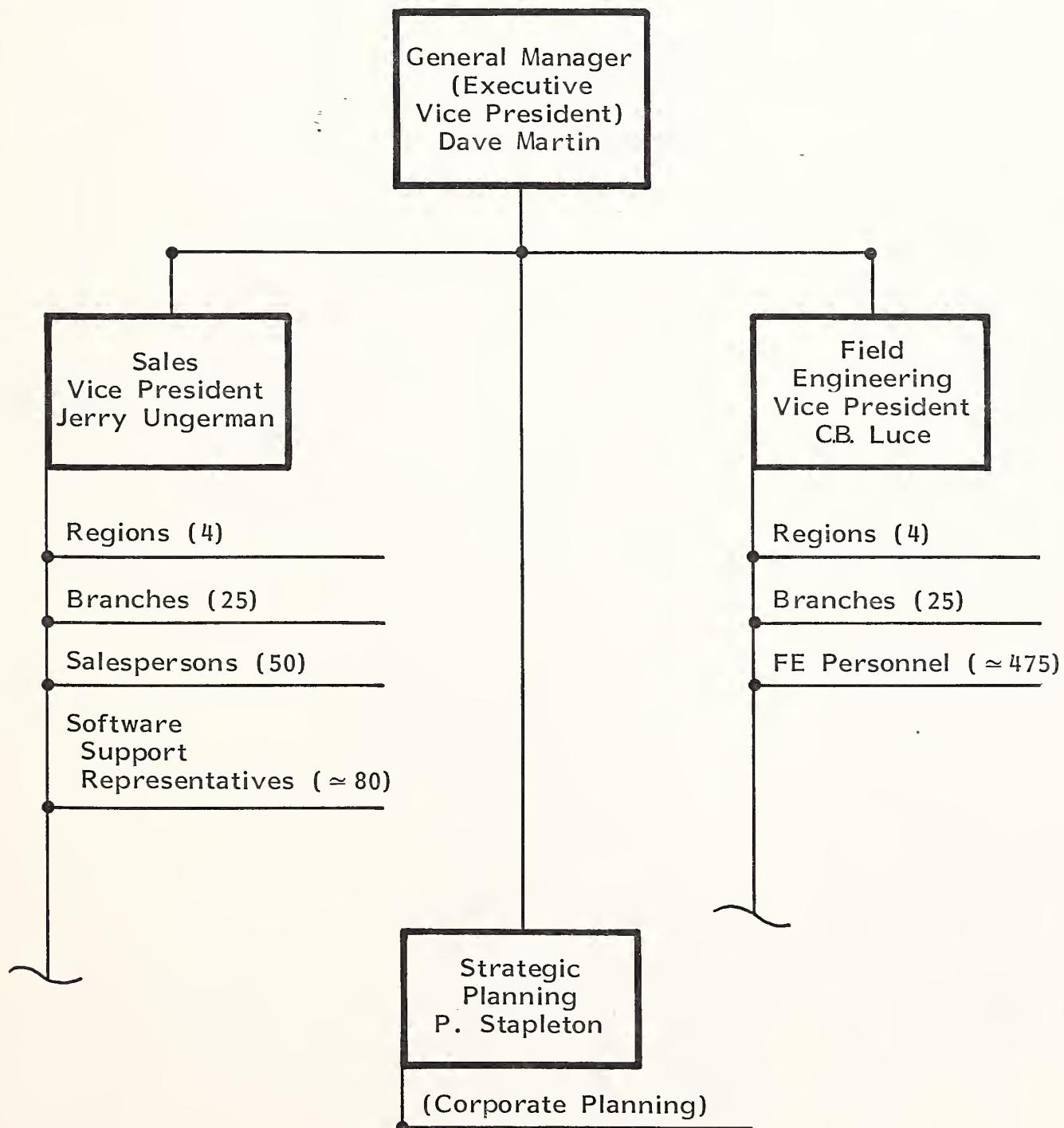
EXHIBIT III-3

NAS PRODUCTS OPERATIONS
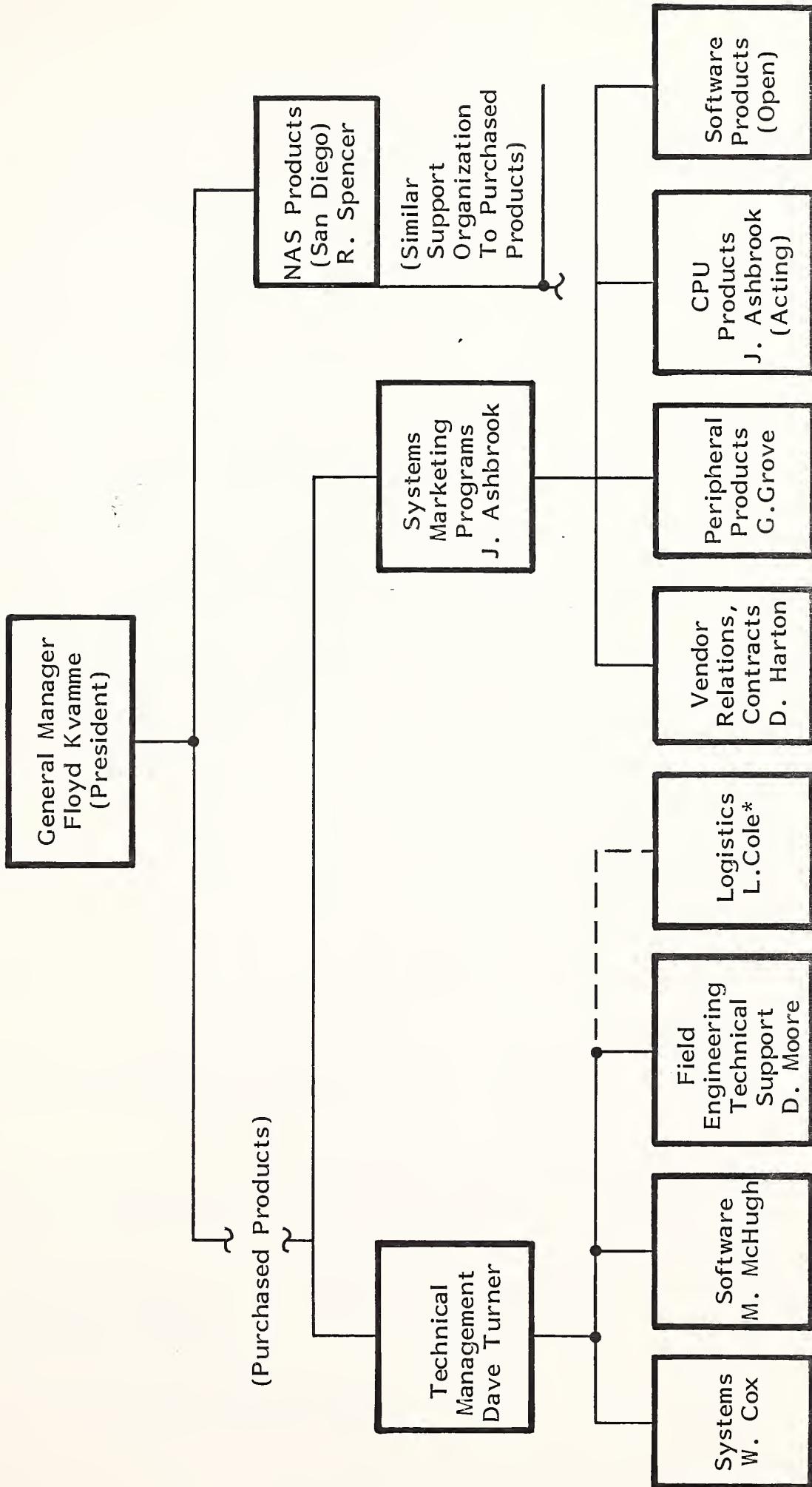
* L. COLE ALSO REPORTS DIRECTLY TO R. ALLEN FOR PRODUCT INVENTORY CONTROL

- This structure is a milder example of internal "Matrix" management than previously practiced between NAS and National Semiconductor.

- Ashbrook still heads the marketing and planning organization which interfaces directly with HITACHI, but Bill Cox has been transferred to Dave Turner in the reorganization.

- San Diego operations under Bob Spencer also report directly to Floyd Kvamme as a part of Product Operations.

- Not shown in the exhibits are personnel located in San Diego, reporting to Dave Turner's organization, and who support NAS products.

- Also located in San Diego is the Central Site for software support which functions as a clearinghouse for field compatibility problems; this group is also under Dave Turner's organization.

C. MANAGEMENT

1. CHANGES

- Floyd Kvamme now has sole authority for NAS as opposed to the prior year in which he was a member of the "Office of the President."

- Wes Thrash no longer has responsibility for NAS field engineering and is only concerned with activities at National Semiconductor.

- C.B. Luce was promoted to Vice President of Field Engineering for U.S. and Canadian business operations.

- Key middle management turnover includes:

- Randolph - Field Engineering Vice President.

- Patrick - Field Engineering product and field support.

- Benjamin - Field Engineering education.

- Isenhour - Software support.

● Major losses of key management at National Semiconductor have created concern within NAS that Charles Sporck might find it necessary to recall some key personnel from NAS to NSC, including Floyd Kvamme.

2.   EVALUATIONS

● C.B. Luce, the new Vice President of Field Engineering for domestic business operations, rose through the ranks within Itel and NAS from field engineer in 1974.

- From October 1974 to June 1978, he was Branch Manager of the Dallas branch office, which grew from about 12 to 30 field engineers during that period.

- He was Region Manager of the Southwest Region, also located in Dallas, from June 1978 until his promotion to Vice President early in 1981.

- His management experience is limited to managing field personnel; he has no staff experience in planning, education, or support management.

- He has a reputation for making good sales calls with salesmen to explain service policies.

- His education is limited to public high school and service technical schools, no undergraduate college.

- Mr. Luce's predecessors (Randolph and Rasmussen) both completed graduate schools with Masters in Business Administration.

● Floyd Kvamme, President of NAS, has improved in his ability to delegate authority and responsibility, according to those interviewed for the 1981 report to HITACHI.

- According to sources, it is a good thing that he has learned to delegate and trust other management better because his expertise remains with the semiconductor business, not the computer business.

- Kvamme is given credit by NAS management for establishing and maintaining credibility with outside suppliers of NAS equipment, especially HITACHI.

- There is some speculation that Kvamme might be recalled to National Semiconductor operations because he is the last of the founding management team remaining. If this happens, it is also likely that NAS would continue to report to Kvamme for a "safe" period of time.

● Dave Martin continues to be perceived by those individuals interviewed as a very bright manager with little ability to manage and inspire people.

● Checks with two executive search firms revealed no evidence that an active search is underway to strengthen top or middle management with new talents from outside.

D.   SAN DIEGO OPERATIONS

● The San Diego operation headed by Bob Spencer has only one product of any possible consequence under development, the "Shark."

- The Shark is a code name for the 203 system.

- The 203 is based on the AS/5000 architecture with the 43XX instruction set added.

- State-of-art Gate Array technology has been employed.

- The product was most recently scheduled for "Beta" test in Mountain View, September 15, 1981.

- While engineers within Spencer's organization remain optimistic, independent testing and support personnel interviewed do not expect a successful first customer shipment before 1982.

  - Those interviewed say that the system dissipates far too much heat for the capacity, the "footprint" is too large, and they question the outdated architecture of the original AS/5 which is still employed.

  - Although not marketing personnel, these same technical personnel, internal to NAS, question whether the Shark can fill the present void in the 43XX marketplace.

- Personnel at San Diego are concerned with what happens to their manufacturing capacity after sales of AS/5000 diminish; they feel that too much hope is placed on the Shark.

- Support personnel located in San Diego all expressed the belief that the NAS computer operations would soon be totally dependent on HITACHI, and that Floyd Kvamme and Bob Spencer should prove with the memory chip manufacturing process that they are qualified to assemble the 240H in San Diego.

- One "desperate" rumor heard in San Diego was that the "400" system was being revived as a possible solution to the 43XX void. (INPUT classifies this as

"desperate" because of the fear that engineers and manufacturing personnel will soon be losing their jobs in San Diego.)

- Software development activities are mainly limited to staying ahead of IBM compatibility challenges.

    - The job of Manager of Software Development remains open, but will report to Ashbrook and will concentrate on purchased products.

    - Software sales are now being pursued, but with very little aggressiveness.

    - Outside developers of software submit potential packages to NAS to be sold to NAS users.

        . The packages are tested for reliability and feasibility as enhancements to hardware sales.

        . Minor alterations are made either by the developer or in concert with NAS software engineers.

        . The packages are then placed in the sales quota and offered as additional benefits.

    - It remains to be seen, after the software management position under Ashbrook is filled, whether software products will be looked at by NAS as potentially profitable products to be marketed aggressively.

- Software support for the field operations is located in San Diego.

    - The total software support organization, including representatives in the field, Mountain View, and San Diego, is estimated at 110 persons.

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- NAS offers a "Central Site" support service to customers similar to IBM.

  - Customers with operating software problems receive first call service remotely by the San Diego facility.

  - If remote attempts to fix by researching "Retain" for outstanding PTFs or unresolved problem files is unsuccessful, the customer has the option of calling a systems support representative on-site for $80 per hour.

  - NAS also offers a software maintenance agreement contract for on-site coverage.

  - No charges for software support are imposed if it turns out that the software support representative is required to assist a field engineer in diagnosing a hardware failure.

- The microcode team is also located in San Diego.

  - The microcode team operates under the primary objective of revising NAS microcode or software within six months after first customer ship by IBM of any enhancements to equivalent hardware systems.

  - The team is reported to be averaging 90 days in response to microcode changes required to maintain compatability objectives, and has established the 90-day target as its internal objective.

- Software support at headquarters also assists in technical sales proposals for complex situations and newer products while the field representatives are still learning.

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- Assistance in benchmarks is provided to field representatives with prospects requiring benchmarks before committing to orders.

- The software support staff is perceived by those interviewed to be well qualified for the support functions and responsibilities accepted by NAS.

E. MARKETING AND SALES

- According to persons interviewed, at least 95% of the complex technical proposals can be professionally presented by the sales regions involved at NAS.

- The approximately 5% of proposals which might be too specialized or which may involve new product applications concepts are presented with assistance from other sales regions and headquarters staff specialists.

- The systems marketing plan reported by interviewees calls for sales of five systems per month in each category according to top-down priority: AS/9000, AS/7000, AS/5000.

    - Sources report that the plan is achievable, on the average, through the first six months of the fiscal year.

    - The same sources doubt that the volume can be maintained after European and Australian prospects are sold, especially the target volume for AS/9000 systems.

    - Also, it is expected that all system sales will suffer during the last half of the fiscal year because of using the same resources on the longer sell-cycle AS/9000, and the relatively shorter sell-cycles for the smaller systems.

-       Persons interviewed at NAS would prefer to see specialized sales teams for the AS/9000 or an enlarged sales force to avoid the dilution of effort on the longer sell-cycles.

● NAS has an objective to sell more operating leases of equipment, but if the objective is quantified, none of the interviewees would report it.

-       Thirty prospects for operating lease sales were identified during INPUT's research.

.   The probability of closing and installing the systems under operating leases for these 30 prospects varied from 25% to 100% as reported by sales management.

.   Lease terms ranged from one to five years.

.   Most of the prospective leases were in the 24- to 36-month range.

.   Quotations for leases varied considerably; but as a rule, if the lease was for 36 months or longer, the payment was calculated on a full payout basis.

.   One lease proposal was for a 24 months payment schedule at 18% interest and with a 48-month depreciation schedule (50% residual value at the end of 24 months).

.   Most of the leases discussed bundled in maintenance, taxes, and insurance, but several variations were presented to accommodate the prospects; e.g., pass-through of investment tax credits.

- Accounting practices for the recording of revenues are very unclear from the sources interviewed; however, the sales forecasts presented to management are usually the present value of the lease payments discounted at 18%.

    . For example, a 36-month net lease of equipment for $14,000 per month was recorded in the forecast of revenues as $393,060.

    . This lease proposal was quoted using "FASB-13" guidelines. The figures are reconciled as a full payout lease (annuity due) at 1.5% per month.

● It was reported to INPUT by two reliable sources that NAS marketing is adjusting for a total dependence on HITACHI for reliable products.

F.   FIELD ENGINEERING

● The field engineering organization is reported to be severely weakened since 1980.

    - Heavy turnover of key personnel has occurred.

    - Three sources reported that several of the top support personnel for HITACHI systems will be leaving by the end of 1981.

        . This report was confirmed by an executive search firm who has been contacted by a large number of NAS field engineering personnel seeking other jobs.

        . The executive search consultant is actively seeking other positions for the most qualified field support personnel.

- Feedback from managers in the field indicated that field engineers are just doing their jobs until something better happens, that they have lost most of their enthusiasm. They feel isolated from upper management at NAS.

- Morale is reported as being low among the field engineering education personnel in California and Maryland.

G. FINANCIAL PERFORMANCE

- Actual figures of the financial performance of NAS are not discussed as freely among personnel at NAS this year.

    - In the relatively soft market that National Semiconductor finds itself it relies on profits from NAS to offset losses in the semiconductor business.

    - To reveal the profits at NAS would allow accurate calculations of the poorer performance at National Semiconductor by deduction.

    - The insecurity of most managers within the company at present is lessened somewhat by keeping more vital information to themselves.

- INPUT was informed that of the $1.15 billion in revenues reported by National Semiconductor last fiscal year, $285 million came from NAS.

    - In the 1980 report to HITACHI, INPUT reported a forecast of $1.175 billion gross revenues.

    - INPUT also forecasted that in order to make the numbers in a projected soft semiconductor market, National Semiconductor would have to rely on at least $210 million from NAS.

- Accounting changes at National Semiconductor did not affect the reporting of revenues at NAS.

    - The change, which defers accounting for revenues until the distributors of semiconductors sell them, should hold National Semiconductor's gross to $1.25 billion or less in fiscal 1982, depending largely on NAS.

    - With the 240H instead of the Shark, and increased specialization at the AS/9000 level, NAS has the potential to increase sales by $100 million in fiscal 1982.

    - Because of uncertainties in product strategies, INPUT remains conservative in forecasting a 30% increase in sales by NAS, or $370 million.

- Reports from within NAS claim that the first quarter of fiscal 1982 was profitable for National Semiconductor only because of NAS profits, even so, profits for National were down 94% compared to the first quarter of 1981.

    - Profits for the first quarter at National were $1.1 million.

    - In the first quarter of the previous year, profits were $17.7 million.

IV USER ANALYSIS

IV   USER ANALYSIS

A.   USER PROFILE

● Thirty-four users were interviewed for the report.

  - All 22 users interviewed in the 1980 analysis were contacted for updates.

  - Eighteen of the original users responded.

  - After making several attempts to get all the original users to respond, INPUT completed the user survey, providing a total of:

    . Ten users of NAS equipment only (AS/5000 series).

    . Eighteen users of HITACHI equipment only.

    . Five users with both NAS and HITACHI mainframes installed.

    . One of the original AS/5 users who responded, but had replaced the system with an IBM 158.

● Total systems represented in the survey were:

-	AS/6	17
-	AS/7000	6
-	AS/9000	2
-	AS/3	1
-	AS/4	1
-	AS/5	11
-	AS/5000	1
-	7031	2

● Respondents were Directors and Assistant Directors of DP.

B.   ANALYSIS OF SURVEY RESULTS

1.   APPROACH TO ANALYSIS

● The survey was performed by telephone, with two exceptions who insisted on responding by return mail.

● In every case where quantifiable responses may be tabulated for statistically significant results, this report displays such results with comments of the analysts employed in the research effort.

- Open-ended questions designed to extract voluntary and qualitative comments are also employed. Selected comments are used in the analysis to emphasize the attitudes of users on various subjects, either by direct quotation or paraphrasing without attribution.

2. LEVEL OF DECISION AUTHORITY REGARDING THE PURCHASE OF PLUG COMPATIBLE MAINFRAMES (PCMs)

- There has been a noticeable shift upwards in the level of executives involved in the decision-making process, as shown in Exhibit IV-1.

- Task force committees are becoming more evident as representing final purchasing authority for PCM equipment.

- Even after consideration of the larger sample size for the 1981 survey, it is clear that proportionately more staff Vice Presidents and Executive Vice Presidents are involved in purchase decisions.

- INPUT concludes this to be a result of higher interest rates, general conservative attitudes toward capital investments, and more realistic options for the purchaser of PCMs.

3. USER ATTITUDES TOWARD PLUG COMPATIBLE MAINFRAMES AND UPGRADING WITH NAS

- Only two respondents reported that they would not consider purchasing another PCM product.

  - One who said, "No," was an AS/5 user from the 1980 survey who has since installed an IBM 158.

  - The other is a user of the 7031 and an AS/6, and blames his lack of satisfaction on compatibility.

EXHIBIT IV-1

LEVEL OF INVOLVEMENT IN DECISIONS TO PURCHASE PCM MAINFRAMES

YEAR AND (SAMPLE SIZE) MANAGEMENT	NUMBER OF RESPONDENTS	
	1980 (22)	1981 (33)
EDP Director	11	13
EDP Manager	6	13
President	5	7
Committee Decision	5	9
Vice President – DP	4	6
Vice President of Finance or Executive Vice President	4	9
Board of Directors	2	2
Other Staff Specialists	7	16

- Only one user is undecided about whether he would consider another PCM, an AS/6 user.

- Of 34 users, 31 reported that they would consider another PCM purchase, a positive response of 91%.

- Both HITACHI and NAS were given higher marks by the 1980 users who responded in 1981, as shown in Exhibit IV-2.

    - While 100% of the eight HITACHI users from the 1980 survey now say they would upgrade with NAS, only 87% of the total HITACHI users surveyed said that they would look to NAS for upgrades.

    - The conclusion drawn from these responses is that the most probable reason for refusal of the three HITACHI users to respond this year is dissatisfaction with NAS.

    - As mentioned earlier in the report, one of the 1980 NAS users replaced the equipment with IBM's; another changed the answer from "No" to "Yes, but with reservations."

- It is clear from comments of users that the quality of peripherals affects the attitudes of users toward the mainframe, whether manufactured by the same company or not.

- In at least one case, the attitude of a user toward the HITACHI AS/6 was affected by the inability of NAS to provide confidence that compatibility with IBM software will be maintained. The user has a 7031 also installed. The user's comments follow:

    - "We are experiencing compatability problems. IBM is getting much more of their software built into their hardware all the time. We suspect there may be compatability problems in the future between PCMs and IBM software."

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EXHIBIT IV-2

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RESPONSES TO QUESTION:
"WILL YOU UPGRADE WITH NAS?"

RESPONSES	PERCENT OF RESPONDENTS				
	NAS		HITACHI		
	1980	1981	1980 USERS	1980 USERS IN 1981	ALL USERS 1981
Yes	64%	80%	91%	100%	87%
No	18	10	0	0	9
Don't Know	18	10	9	0	4
Total Respondents	11	10	11	8	23

- 34 -

-   Another comment from the same user, "We are getting an IBM 3081, we've run out of computing power, we've decided on that."

4. FACTORS IMPORTANT TO THE SELECTION OF PLUG COMPATIBLE MAINFRAME VENDORS

- Users remain consistent in reporting reliability as the most important factor governing their selection of PCM vendor, as shown in Exhibit IV-3.

- While maintenance remains a close second among users of NAS equipment, the HITACHI users indicate less concern for maintenance, based, no doubt, on the higher confidence users have in the reliability of HITACHI equipment.

- Price/performance, as expected, remains a very important factor for all users.

- There was virtually no change in users' attitudes toward field upgradability as one of the major factors in vendor selection; the HITACHI users give this factor slightly more weight than do the NAS users.

- Users continue to exhibit the least concern for having a single vendor for all equipment within the installation.

    -   NAS users increased the importance of this factor from 2.0 to 2.4 (out of a possible 5.0).

    -   HITACHI users decreased the importance of having a single vendor since 1980.

5. USER RATINGS OF NATIONAL ADVANCED SYSTEMS

- NAS company image has dropped slightly, as shown in Exhibit IV-4.

EXHIBIT IV-3

IMPORTANCE OF FACTORS IN
SELECTION OF PCM VENDOR

VENDOR RATING / FACTOR	NAS		HITACHI		
	1980	1981	1980	1980 USERS IN 1981	ALL USERS 1981
Price/Performance	4.4	4.5	4.6	4.4	4.5
Maintenance	4.6	4.6	4.6	3.9	4.2
Software Support	3.5	3.7	3.5	3.3	3.7
Single Vendor	2.0	2.4	2.4	2.4	2.1
Vendor Image	3.8	3.8	3.6	3.4	3.7
Reliability	4.7	4.7	4.8	4.7	4.8
Financial Arrangements	3.7	3.5	3.5	3.2	3.5
Field Upgradability	3.9	3.8	4.1	4.1	4.1
Total Respondents	11	10	11	8	23

NOTE: Ratings based on a scale of 5 = highest, 1 = lowest.

EXHIBIT IV-4

RATING OF NAS BY USERS

RATING / FACTOR	NAS		HITACHI		
	1980	1981	1980	1980 USERS IN 1981	ALL USERS 1981
Company Image	3.9	3.4	3.8	3.4	3.6
PCM Products	4.5	4.1	4.3	4.5	4.4
Field Sales Professionalism	4.0	4.2	3.8	4.2	3.8
Maintenance	4.5	4.2	4.3	4.3	4.0
Financial Arrangements	3.5	3.6	3.5	3.4	3.7
Total Respondents	11	10	11	8	23

NOTE: Ratings based on a scale of 5 = highest, 1 = lowest.

- Several users commented that they would like to see more public relations efforts by NAS; concerted efforts to identify the company as a committed mainframe vendor.

- The systems users respect National Semiconductor for what it is, but feel that the company's image places too much emphasis on the semiconductor business, with NAS as a "footnote" in most published reports.

- The 1980 user survey revealed a feeling among users of gratitude toward National Semiconductor for having saved the business from an uncertain future after Itel. The 1981 survey reveals a concern that National might not be as committed as they had hoped.

- The attitude of users toward the professionalism of the NAS sales force has remained constant, with slight improvement among the users of NAS equipment.

  - When asked to comment on individual salespersons, the users gave NAS sales an average rating of 3.8, down from 4.2 in 1980.

  - Users therefore rate sales professionalism differently, depending on whether they are asked to rate the entire company or individuals.

- Users downgraded NAS as a supplier of PCM products while showing a very slight improvement in rating for HITACHI.

- Maintenance has slipped in quality according to the users.

- The only category in which NAS improved among all users is financial arrangements.

6. COMPATIBILITY GUARANTEES

- Of 33 users, 18 reported that they are guaranteed by NAS that the systems will remain compatible to IBM software which operates on similar equipment.

- Fifteen of the users reporting guarantees have at least one HITACHI system installed.

- Eight guarantees are in writing, six of which apply to users of HITACHI systems.

    - Four guarantees were written by Itel.

    - Two were by NAS.

- The remaining guarantees of compatibility are stated as verbal from sales and software support personnel.

- The inference from this survey is that as many as 50% of the users believe that IBM compatability is guaranteed and that 25% have it in writing.

- In the survey of NAS software personnel, INPUT discovered that the software support representatives work under the assumption that there is a guarantee to users that incompatibilities will be resolved within 180 days, and that the operating objective of support is to resolve deficiencies within 90 days.

7. PURCHASE OR LEASE OF SYSTEMS

- Users show a stronger tendency toward leasing systems, as shown in Exhibit IV-5.

- While only 60% of the NAS users surveyed had purchased their systems outright from NAS, 20% are leasing with the option to purchase with lease credits.

EXHIBIT IV-5

PERCENT OF RESPONDENTS PURCHASING SYSTEMS
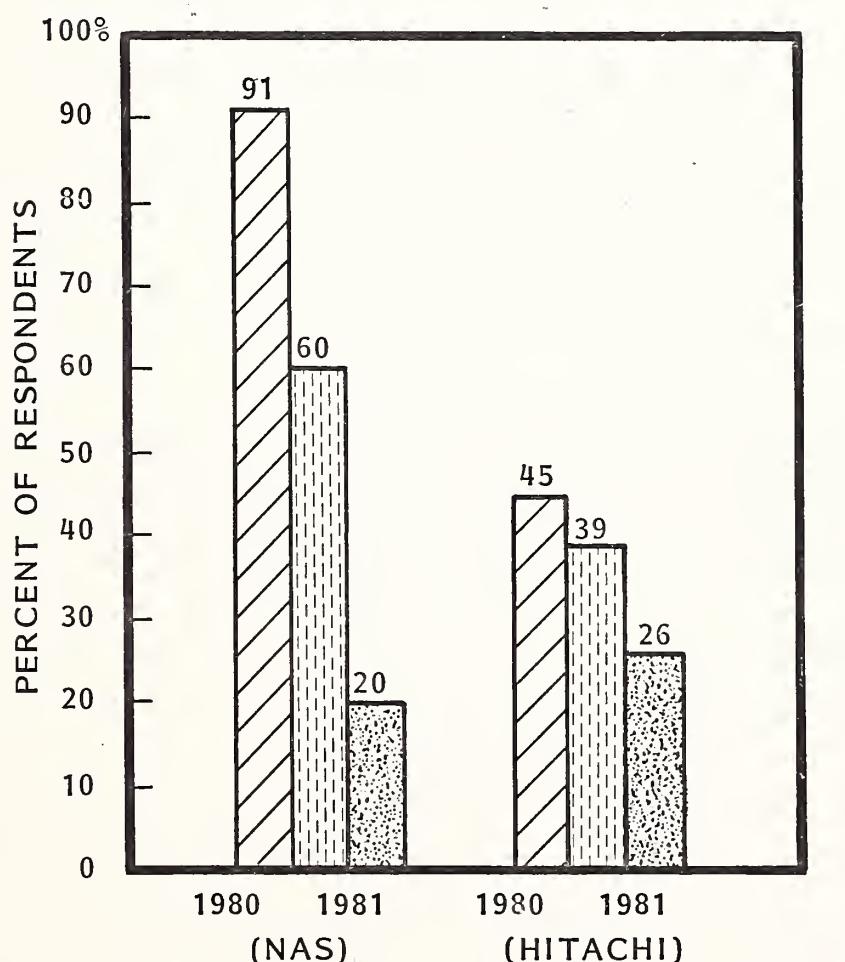
LEGEND: ▧ = Outright Purchases, 1980 Report

▨ = Outright Purchases, 1981

▨ = Lease/Purchase Contracts, 1981

- Users of HITACHI systems are more likely to lease and to reserve purchase options.

    - Only 39% of the users purchased HITACHI systems.

    - Twenty-six percent reserved purchase options, which represents a potential of selling a total of 65% by the end of outstanding leases to 61% of the HITACHI users.

8.   USER ATTITUDES TOWARD DISK DRIVES

- Users admit that poor performance of disk drives manufactured by ISS affects their attitudes toward HITACHI equipment unless they are asked in a survey or otherwise to discriminate between disk and system performance.

- The following is a statement of the user of an AS/7000 system and ISS disk drives:

    - "They were horror stories for three or four years, garbage. In the last six months they have straightened out most of the problems. We were losing HDAs like crazy. We only kept them because we own them and they are difficult to sell."

- Comments from users of HITACHI drives were usually, "Excellent."

- Users of disk drives not distributed by NAS were generally satisfied.

    - STC drives received very high praise similar to HITACHI's.

    - Memorex drives received satisfactory-to-poor remarks, but none as poor as ISS.

9. USER ATTITUDES TOWARD MAINTENANCE

- As mentioned earlier, the general perception of users is that maintenance has decreased in quality over the past year.

- One AS/7000 user had problems with the maintenance of his AS/5 and is withholding judgement on the AS/7000 maintenance until he has problems. His comment was too long to repeat in entirety, but is paraphrased below:

    - "We had lots of problems with our AS/5 . . . difficulty getting service . . . specialist from California couldn't figure out the problem either . . . dragged on and on . . . they (NAS) have some very qualified people and some people who aren't worth a s___ (expletive)."

    - This user also had ISS disk drives installed.

- The following is the comment of an AS/6 user who has IBM and STC disks installed:

    - "I'm pretty pleased with the vendors. We have monthly status meetings with NAS and STC. We have a very good working relationship."

    - This user rated NAS with 3.5 in maintenance while rating both IBM and STC (both peripheral vendors) 3.0.

- Another AS/6 user commented:

    - "Generally service is fine. Sometimes their communications lines are not what they could be. If the service representative can't handle a problem, it takes too long for him to get the help he needs to fix it."

    - This user commented also on the fact that they receive very little "extra" in the way of applications assistance or goodwill calls from software support personnel.

INPUT

- **Other comments:**

  - From an AS/6 user, "The mainframe has only been down twice in four years . . . the FE is like the 'Maytag Repairman' . . . our real complaint is in software support, if IBM were our vendor, they would be in here helping us to install new software."

  - A user of both NAS and HITACHI systems, "We get caught without spare parts sometimes . . . they give nothing 'extra' in hardware or software support."

  - AS/6 user, "I rate them a five on effort and desire to do a good job, but a four on results."

  - AS/6 user with HITACHI disk drive, "The backup people for the field engineers are incompetent. (NAMED PEOPLE) in the field engineers are incompetent. (NAMED PERSON), in particular, is way over his head . . . had to wait over a month for a head to arrive from Japan . . . can't believe not one in all of U.S. . . . interface between NAS and HITACHI is the pits . . . quality of field engineers differs remarkably, some sharp, some 'yo yo's . . . not as professional as IBM."

  - A Federal Government user of AS/5, "Some of the best maintenance we've ever had."

  - A utilities company using AS/5, "Our engineers are top notch."

  - A city government using AS/5, "We have no complaints with NAS. Don't ask us about IBM right now! The 4341 has been down 14 times in six months."

  - AS/3 user, "Their service runs hot and cold, depending on the type problem. Service is not consistent."

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- Sarcastic remark from AS/5000 user who rated NAS maintenance a 1.0, "We're just lucky that it runs so well," and, "We have to 'invite' the field engineer to come by and read the EREP."

10. MISCELLANEOUS RESULTS OF USER SURVEY

- All users were aware of the change from Itel to NAS.

    - Two of the 33 users say that total service is worse under NAS than it was under Itel.

    - Six users believe that service is better.

    - The remaining 25 see no change in the level of service.

- Three of the 23 HITACHI users are under the impression that there is a pass-through of warranty directly to HITACHI; all three have equipment which was installed at least one year prior to the survey.

- Users displayed little knowledge or interest in trade-in policies, only two of 33 had negotiated a trade-in with NAS.

- Less than one-half the users replied with attitudes about expected discounts when dealing with plug compatible vendors. Those with definite opinions expect discounts of 20% to 30% under IBM prices for equivalent hardware.

- Only three users reported that they cannot recall the last visit of their NAS salesperson.

    - All three are users of HITACHI systems.

    - Amdahl salespersons have recently called on five HITACHI installations.

APPENDIX: USER QUESTIONNAIRE

AN ANALYSIS OF NATIONAL
SEMICONDUCTOR'S ADVANCED SYSTEMS DIVISION

USER QUESTIONNAIRE

● The objectives of this interview are to:

- Profile current and future customers and prospects.

- Determine the degree of customer satisfaction with NAS installed systems.

- Determine users' plans for future purchases.

1. Do you currently have installed, or plan to install a computer system produced or marketed by Itel, Hitachi or National Advanced Systems?

a) Yes ☐   Installed   _____

                   Plan to Install   _____

b) No ☐   (on order)

    (NOTE: If "No," advance to Question 19, but only if respondent previously had a NAS or Itel System, otherwise, terminate.)

2. If you have one of these PCMs installed, would you consider installing additional plug compatible mainframes?

    ☐ Yes   ☐ No

a) Why? (explanation)

_____

_____

_____

_____

INPUT

3. What do you see as deterents to the purchase of large plug compatible mainframes?

    _____ — 46 — _____

    _____

    _____

    _____

4. How many Itel, Hitachi or National computer systems does your company have installed and/or plan to install?

Model	Currently Installed		Additional or New Installations	
	Quantity	Installation Date(s)	Quantity	Installation Date(s)
a) AS/5000N				
b) AS/5000				
c) AS/5000 DPC*				
d) AS/7000N				
e) AS/7000				
f) AS/7000 DPC*				
g) AS/9000N				
h) AS/9000				
i) AS/9000 DPC*				
j) Others_____				

*DPC = "Dual Processor Complex"

Note to R/A, depending on when systems were purchased, the user may call them: AS/3, AS/4, AS/5, AS/6, etc.

INPUT

5. a) Have you purchased ☐ or leased ☐ systems?

    b) If leased: Terms of lease: _____ months

        Who carries paper: ☐ Itel   ☐ 3rd party

                           ☐ National   ☐ Other

6. a) Will you upgrade your installed base to include products and future enhancements as announced by NAS?

        ☐ Yes   ☐ No

    b) Why? (comments concerning loyalty to vendor):

        _____

        _____

        _____

        _____

        _____

    c) Who manufactured the disk drives on your system?

        ☐ ISS

        ☐ Hitachi

        ☐ Don't Know

        ☐ Other

        Comment on performance: _____

        _____

        _____

        _____

        _____

INPUT

7. Please indicate who performs maintenance on your system, and rate the overall quality of the service: (5 = outstanding, 1 = poor)

Product	Rating
a) CPU: _____ Maintenance Vendor: _____	
b) CPU: _____ Maintenance Vendor: _____	
c) CPU: _____ Maintenance Vendor: _____	
d) CPU: _____ Maintenance Vendor _____	

e) Comments:

_____

_____

_____

_____

INPUT

8. Please rate the following factors as to their degree of importance in selecting a plug compatible mainframe vendor (5 = high, 1 = low), and rank "5"s: (Note to interviewer: Be sure to get the most <u>important</u> factor in selecting a mainframe vendor)

Factor	Rate	Rank 5s	Comment
a) Price/Performance			
b) Hardware Maintenance Capability of Vendor			
c) Software Support Capability			
d) Single Vendor for All System Purchases (CPU & Peripherals)			
e) Vendor Image/ Viability/Reputation in Field			
f) Product Reliability			
g) Financial Arrangements (terms and conditions)			
h) Field Upgradability			
i) Other (describe)			

j) What does your NAS support person provide in the way of non-standard or extra information or hardware or software? (describe): _____

_____

_____

_____

INPUT

9.   a.   Were you aware of Itel Systems marketing being taken over by National?

☐ Yes   ☐ No

b.   Has there been any change in the level of service?

☐ Yes   ☐ No

c.   If "Yes," explain: _____

_____

_____

_____

10.   When you selected your mainframe vendor, who was involved in the final decision? (check all that apply)

a) ☐ EDP Manager

b) ☐ Corporate EDP Director

c) ☐ Vice President of Data Processing

d) ☐ President or Chairman

e) ☐ Vice President of Finance, Administration, or Executive Vice President

f) ☐ Committee Decision

g) ☐ Board of Directors

h) ☐ Other (describe)

_____

_____

i) ☐ Don't Know

INPUT

11. Have you received any guarantee from your vendor concerning compatibility of the product with IBM?

    a) Yes ☐

    b) No ☐

    c) From Itel ☐

    d) From NAS ☐

    e) Date _____

    f) Describe: _____

    _____

    _____

    g) Has either Itel or NAS passed through the manufacturer's warranty from you directly to Hitachi?

        ☐ Yes   ☐ No

12. Please describe any trade-in policies National is offering for old machines.

_____

_____

_____

_____

INPUT

13. What percentage price reduction do you require for purchasing or leasing IBM plug compatible mainframes or peripherals?

% Reduction	PCM	PCP
a) < 10%		
b) 10 - 20%		
c) 20 - 30%		
d) 30 - 40%		
e) 40 - 50%		
f) > 50%		

14. Have you had a plug compatible mainframe (PCM) salesman call on you in the last six months?

[ ] Yes   [ ] No

If "Yes," from which company?

_____

15. a) Have you been contacted by a salesperson from National Advanced Systems?

[ ] Yes   [ ] No

If Yes," what was the date? _____

b) Rate his/her professionalism. (5 = highest, 1 = lowest): _____

Comments: _____

_____

_____

INPUT

16. Who in your company attended "CHACE" User Group at NCC?

Name: _____

Comments: _____

_____

_____

_____

_____

17. Rate National Semiconductor's Advanced Systems Division from your perception on the following factors: (5 = highest, 1 = lowest)

Factor	Rating	Rank 5s	Comments
a) Company Image			
b) Plug Compatible Products			
c) Field Sales Knowledge and Professionalism			
d) Field Maintenance Capability			
e) Financial Arrangements (terms and conditions)			
f) Other			

INPUT

18. What marketing or technical suggestions for improvement would you offer the vendor of your PCM?

_____

_____

_____

_____

☐ No Comment

THANK YOU VERY MUCH!

(Completion of Interview with actual or planned NAS users)

INPUT